CLAIMS

1. A method of iteratively adjusting frequency bandwidths in a communications network of twisted pair modem links containing a plurality of modems, the method comprising the acts of:

for each of said plurality of modem links, transmitting signals with an initial power spectral density mask;

measuring a signal to noise ratio for the transmitted signals;

bitloading the initial power spectral density mask for a desired data rate and a desired signal to noise ratio margin;

measuring and comparing an actual signal to noise ratio margin to the desired signal to noise ratio margin; and

adjusting the frequency bandwidth allocated in the initial power spectral density mask to minimize NEXT interference if the actual signal to noise ratio margin is not within an acceptable tolerance of the desired signal to noise ratio margin.

2. The method of adjusting frequency bandwidth according to claim 1, wherein the act of adjusting the frequency bandwidth includes reducing the bandwidth when the actual signal to

noise ratio margin is greater than the target signal to ration margin by a predetermined tolerance.

3. The method of adjusting frequency bandwidth according to claim 2, wherein the act of adjusting the frequency bandwidth includes increasing the bandwidth when the actual signal to noise ratio margin is less than the target signal to noise ratio margin by a predetermined tolerance.

4. The method of adjusting frequency bandwidth according to claim 3, wherein the act of adjusting the frequency bandwidth is repeated until the actual signal to noise ratio margin is within the acceptable tolerance of the target signal to ratio margin.

5. The method of adjusting frequency bandwidth according to claim 4, wherein an upstream and downstream frequency bandwidths are adjusted.

6. The method of adjusting frequency bandwidth according to claim 5, wherein bitloading and transmission rates are increased in frequency bandwidths of the power spectral density mask that do not produce NEXT interference.

7. The method of adjusting frequency bandwidth according to claim 5, wherein bitloading and transmission rates are decreased in frequency bandwidths of the power spectral density mask that produce NEXT interference.

8. The method of adjusting frequency bandwidth according to claim 5, wherein the upstream and downstream frequency bandwidths are adjusted by unequal amounts.

9. The method of adjusting frequency bandwidth according to claim 7, wherein the power of the upstream and downstream frequency bandwidths remains the same.

10. A communication system comprising:

a plurality of modems simultaneously communicating over a plurality of twisted pair connections; and

a controller for adjusting frequency bandwidths of upstream and downstream communications to reduce NEXT interference for each modem, wherein a process for adjusting the bandwidths of the upstream and downstream communications is repeated until a desired bit rate and desired signal to noise ratio margin are obtained.

11. The communication system of claim 10, wherein the process for adjusting the bandwidth comprises; transmitting signals with an initial power spectral density mask; measuring a signal to noise ratio for the transmitted signals; bitloading the initial power spectral density mask for a desired data rate and a desired signal to noise ratio margin; measuring and comparing an actual signal to noise ratio margin to the desired signal to noise ratio margin; and adjusting the frequency bandwidth allocated in the initial power spectral density mask if the actual signal to noise ratio margin is not within an acceptable tolerance of the desired signal to noise ratio margin.

12. The communication system of claim 11, wherein the controller further comprises a control modem, a control memory and a controlling processor.

13. The communication system according to claim 11, wherein the process of adjusting bandwidth includes reducing the bandwidth of frequencies that produce NEXT interference.

14. The communication system of claim 13, wherein the process of adjusting the frequency bandwidth includes increasing the bandwidth when the actual signal to noise ratio margin is less than an acceptable tolerance below the desired signal to noise ratio margin.

15. A method of adjusting power and frequency bandwidth in a communications network of twisted pair modem links containing a plurality of modems, the method comprising the acts of:

for each of said plurality of modem links, transmitting signals with an initial power spectral density mask;

measuring a signal to noise ratio for the transmitted signals;

bitloading the initial power spectral density mask for a desired data rate and a desired signal to noise ratio margin;

measuring and comparing an actual signal to noise ratio margin to the desired signal to noise ratio margin; and

adjusting power and frequency bandwidth allocated in the initial power spectral density mask if the actual signal to noise ratio is not within an acceptable tolerance of the desired signal to noise ratio margin.

16. The method of adjusting power and frequency bandwidth of claim 15, wherein the act of adjusting the power and the frequency bandwidth includes reducing power within a selected frequency bandwidth when the actual signal to noise ratio margin is greater than the acceptable tolerance above the desired signal to noise ratio margin.

17. The method of adjusting power and frequency bandwidth of claim 16, wherein the act of adjusting power and the frequency bandwidth includes decreasing power within an upstream and down stream frequency bandwidth.

18. The method of adjusting power and frequency bandwidth of claim 15, wherein the act of adjusting power and the frequency bandwidth includes increasing power within a selected bandwidth when the actual signal to noise ratio margin is less than the acceptable tolerance below the desired signal to noise ratio margin.

19. The method of adjusting power and frequency bandwidth of claim 15, wherein the bandwidths of upstream and downstream communications overlap.

20. The method of adjusting power and frequency bandwidth of claim 15, wherein the power and bandwidth are adjusted in accordance with an algorithm.

21. A method of adjusting frequency bandwidths and bit transmission rates in a communications network of twisted pair modem links containing a plurality of modems to reduce NEXT interference, the method comprising the acts of:

determining frequency bandwidths allocated in an initial power spectral density mask that produce NEXT interference;

increasing bitloading and transmission rates in frequency bandwidths of the power spectral density mask that do not produce NEXT interference; and

decreasing bitloading and transmission rates in frequency bandwidths of the power spectral density mask that produce NEXT interference.

22. A method of adjusting frequency bandwidths and bit transmission rates as in claim 21, wherein the act of determining frequency bandwidths allocated in an initial power spectral density mask that produce NEXT interference includes measuring a signal to noise ratio.

23. A method of adjusting frequency bandwidths and bit transmission rates as in claim 21, wherein the act of determining frequency bandwidths allocated in an initial power spectral density mask that produce NEXT interference is performed repeatedly for each modem link communication channel.

24. A method of adjusting frequency bandwidths and bit transmission rates as in claim 23, wherein the act of determining frequency bandwidths allocated in an initial power spectral density mask that produce NEXT interference is performed while other modem links in the network are transmitting data.

25. A method of adjusting frequency bandwidths and bit transmission rates as in claim 21, wherein the act of decreasing bitloading and transmission rates in frequency bandwidths of the power spectral density mask that produce NEXT interference includes decreasing the power of signals that produce NEXT interference.

26. A method of adjusting transmission parameters in a communications network of twisted pair modem links containing a plurality of modems to reduce NEXT interference, the method comprising the acts of:

determining frequency bandwidths allocated in an initial power spectral density mask that produce NEXT interference; and

adjusting at least one of bitloading rates, power, and frequency bandwidth parameters of the power spectral density mask, wherein NEXT interference is minimized and a desired signal to noise ratio is maintained.

27. A method of adjusting transmission parameters as in claim 26, wherein at least two of bitloading rates, power, and frequency bandwidth parameters are adjusted.

28. A method of adjusting transmission parameters as in claim 26, wherein all of bitloading rates, power, and frequency bandwidth parameters are adjusted.